

Claims

- [c1] A method for packaging a foodstuff which comprises placing said foodstuff in a chamber during its packaging process, providing under pressure at least one flush of one or more gases to said foodstuff whereby at least some of said gas or gases from said at least one flush at least partially penetrates the structure of the foodstuff within a predetermined time, and thereafter sealing said foodstuff in a container.
- [c2] A method for packaging fresh meat comprising placing the meat on a container and introducing said container into a chamber, closing the chamber, subjecting said container to a first vacuum, introducing a first flush of one or more gases within said container and holding said meat within the environment of said first flush of one or more gases for a predetermined period of time wherein said one or more gases at least partially penetrate the meat structure, releasing said first flush of one or more gases, introducing a second flush of one or more gases within said chamber for a predetermined period of time, and sealing said meat within said container with one or more of the gases introduced from said second flush.

- [c3] The method according to claim 2 wherein the gas or gases introduced during the second flush is the same as the gas or gases introduced during the first flush.
- [c4] The method according to claim 2 wherein the gas or gases introduced during the first flush is selected from the group consisting of oxygen, carbon monoxide, nitrogen and carbon dioxide.
- [c5] A method for the reduction of metmyoglobin formation in fresh packaged meat comprising placing the meat on a container and introducing said container into a chamber, evacuating the atmosphere of said chamber to a predetermined pressure below atmospheric pressure by pulling a first vacuum, stopping said first vacuum, introducing a first flush of one or more gases within said chamber at a pressure above atmospheric pressure and continuing the introduction of said first flush until the chamber pressure reaches a predetermined pressure, stopping the first flush of one or more gases, maintaining the meat within the environment of the first flush of gas or gases at this predetermined chamber pressure for a predetermined period of time so as to allow at least some of the gas or gases from said first flush to at least partially penetrate the meat structure, releasing the first flush of gas or gases from the chamber, evacuating the

atmosphere of the chamber to a second predetermined pressure by pulling a second vacuum, stopping the second vacuum, introducing a second flush of one or more gases within the chamber at a predetermined pressure and continuing the introduction of said second flush of gas or gases until the chamber pressure reaches a predetermined pressure, and thereafter sealing the meat within said container.

[c6] The method according to claim 5 wherein said meat is held within the environment of said second flush of gas or gases for a predetermined period of time, releasing said second flush of gas or gases, evacuating the atmosphere of said chamber to a predetermined pressure by pulling a third vacuum, stopping the third vacuum, and introducing a third flush of one or more gases within said chamber, continuing the introduction of said third flush of gas or gases until the chamber pressure reaches a predetermined pressure, said meat being thereafter sealed within said container with at least some of the gas or gases associated with said third flush.

[c7] The method according to claim 5 wherein said first vacuum is at a pressure which is less than 500 millibars.

[c8] The method according to claim 5 wherein said first vacuum is at a pressure which is less than 100 millibars.

- [c9] The method according to claim 5 wherein said first flush of gas or gases is allowed to raise the chamber pressure to a predetermined pressure above atmospheric pressure.
- [c10] The method according to claim 9 wherein said predetermined chamber pressure is at least 250 psi.
- [c11] The method according to claim 5 wherein said meat is held within the environment of said first flush for no more than ten minutes.
- [c12] The method according to claim 5 wherein the introduction of said second flush of gas or gases is allowed to raise the chamber pressure to at least atmospheric pressure.
- [c13] The method according to claim 5 including performing any plurality of first vacuums and first flushes prior to conducting said second vacuum and said second flush.
- [c14] A method for the reduction of metmyoglobin formation in fresh packaged meat comprising placing the meat on a container and introducing said container into a chamber, evacuating the atmosphere of said chamber to a predetermined pressure below atmospheric pressure by pulling a first vacuum, stopping said first vacuum, intro-

ducing a first flush of one or more gases within said chamber at a pressure above atmospheric pressure and continuing the introduction of said first flush until the chamber pressure reaches a predetermined pressure, stopping the first flush of gas or gases, maintaining the meat within the environment of the first flush of gas or gases at this predetermined chamber pressure for a predetermined period of time so as to allow at least some of the gas or gases from said first flush to at least partially penetrate the meat structure, releasing the first flush of gas or gases from the chamber and simultaneously therewith introducing a second flush of one or more gases, continuing the introduction of said second flush of gas or gases until the chamber pressure reaches a predetermined pressure, and thereafter sealing the meat within said container.

[c15] The method according to claim 14 wherein said first vacuum evacuates the chamber to a pressure less than 500 millibars.

[c16] A method for packaging foodstuff which comprises placing the foodstuff on a container and introducing said container into a chamber, introducing a first flush of one or more gases within said chamber while said container is maintained under a first vacuum wherein at least some of the gas or gases penetrate into the structure of the

foodstuff, stopping the first flush of gas or gases and releasing said first vacuum, introducing a second flush of one or more gases within said chamber while said container is maintained under a second vacuum.

- [c17] The method according to claim 16 wherein the gas or gases introduced during the second flush is the same as the gas or gases introduced during the first flush.
- [c18] The method according to claim 16 wherein one or more gases are selected from the group consisting of oxygen, carbon monoxide, nitrogen and carbon dioxide.
- [c19] The method according to claim 16 wherein said first and second vacuums are at a pressure from about 500 millibars to about 100 millibars.
- [c20] The method according to claim 16 wherein said gas or gases are introduced at a pressure above the chamber pressure.
- [c21] The method according to claim 20 wherein said gas or gases raise the chamber pressure to a predetermined chamber pressure.
- [c22] The method according to claim 16 wherein said second flush includes an anti-microbial gas, and further including stopping the second flush of one or more gases and

releasing said second vacuum, introducing a third flush of one or more gases within the chamber while said container is maintained under a third vacuum, stopping the third flush of one or more gases, and sealing the container with the meat and at least some of the gas or gases from said third flush.

[c23] The method according to claim 16 wherein said second flush includes the modified atmosphere for sealing the foodstuff within the container, stopping the second flush of one or more gases and sealing the container with the foodstuff and at least some of the modified atmosphere from said second flush.

[c24] A method for the reduction of metmyoglobin formation in fresh packaged meat which comprises placing the meat on a container and introducing said container into a chamber, introducing a first flush of one or more gases within said chamber while maintaining said container under vacuum wherein said gas or gases are allowed to at least partially penetrate into the meat structure, maintaining the vacuum while stopping the first flush of gas or gases, and thereafter introducing a second flush of one or more gases within said chamber while still maintaining said vacuum, stopping said second flush of gas or gases, and sealing said container with the meat and at least some of the gas or gases from said second flush.

[c25] A method for packaging fresh meat comprising placing the meat on a container and introducing said container into a chamber, introducing a first flush of one or more gases within said chamber while maintaining said container under vacuum wherein at least some of said gas or gases are allowed to at least partially penetrate into the meat structure, maintaining said vacuum while stopping the first flush of gas or gases, introducing any number of additional flushes of one or more gases within the chamber while still maintaining said vacuum wherein at least some of said gas or gases from said additional flushes are allowed to at least partially penetrate into the meat structure, maintaining said vacuum while respectively stopping each of said additional flushes of gas or gases, and thereafter introducing a final flush of one or more gases within said chamber while still maintaining said vacuum, stopping said final flush of gas or gases, and sealing said container with the meat and at least some of the gas or gases from said final flush.

[c26] A method for packaging fresh meat which comprises placing the meat on a container and introducing said container into a chamber, introducing one or more gases within said chamber via a first gas port associated with said chamber while maintaining said container under vacuum wherein at least some of said gas or gases are

allowed to at least partially penetrate into the meat structure and simultaneously introducing one or more gases within said chamber via a second gas port associated with said chamber wherein at least some of said gas or gases are allowed to at least partially penetrate into the meat structure.

[c27] Apparatus for packaging fresh meat comprising a packaging system which includes a first chamber and a second chamber adapted to hold one or more containers, means for isolating the atmosphere of said first and second chambers about said container to create a defined space around said container, a vacuum port for creating a vacuum within said defined space when said first and second chambers are closed about said container, at least two gas ports for introducing one or more gases into said defined space when said first and second chambers are closed about said container, and means to seal said container.

[c28] The apparatus according to claim 27 wherein said apparatus includes a plurality of gas ports for introducing one or more gases into said defined space when said first and second chambers are closed.

[c29] Packaged meat which comprises meat containing one or more gases within its structure as a result of said meat

having undergone one or more flushes with a gas or gases while said meat is subjected to vacuum.

- [c30] Packaged meat processed according to the methods of claims 1, 2, 5, 14, 16, 22, 24, 25 and 26.
- [c31] A method for packaging fresh meat comprising placing the meat on a container and introducing said container into a chamber, subjecting said container to a first vacuum, introducing a first flush of one or more gases within said container and holding said meat within the environment of said first flush of one or more gases for a predetermined period of time wherein said one or more gases at least partially penetrate the meat structure, releasing the first flush of one or more gases, introducing any number of additional flushes of one or more gases within the chamber and respectively holding said meat within the environment of each respective additional flush of one or more gases for a predetermined period of time, and sealing said meat within said container with one or more of the gases introduced from said final flush.
- [c32] A method for packaging fresh meat comprising placing the meat on a container and introducing said container into a chamber, evacuating the atmosphere of said chamber to a predetermined pressure below atmospheric

pressure by pulling a first vacuum, stopping said first vacuum, introducing a first flush of one or more gases within said chamber at a pressure above atmospheric pressure and continuing the introduction of said first flush until the chamber pressure reaches a predetermined pressure, stopping the first flush of gas or gases, maintaining the meat within the environment of the first flush of gas or gases at this predetermined chamber pressure for a predetermined period of time, releasing the first flush of gas or gases from the chamber, introducing any number of additional flushes of one or more gases within the chamber at a predetermined pressure after first respectively evacuating the atmosphere of the chamber to a predetermined pressure by pulling a respective vacuum prior to the introduction of each additional flush, and continuing the introduction of each additional flush of one or more gases until the chamber pressure reaches a predetermined pressure, and thereafter sealing the meat within said container.

[c33] A method for packaging foodstuff comprising placing the foodstuff on a container and introducing said container into a chamber, introducing a first flush of one or more gases within said chamber while said container is maintained under a first vacuum, stopping the first flush of gas or gases and releasing said first vacuum, intro-

ducing any number of additional flushes of one or more gases within the chamber while said container is maintained under a corresponding number of respective vacuums, stopping each respective flush of gas or gases and releasing the corresponding respective vacuum, and thereafter sealing the foodstuff within said container.

[c34] A method for packaging fresh meat which comprises placing the meat on a container and introducing said container into a chamber, introducing one or more gases within said chamber via a first gas port associated with said chamber, and simultaneously introducing one or more gases within said chamber via a second gas port associated with said chamber.

[c35] A method for packing fresh meat comprising placing the meat on a container and introducing said container into a chamber, evacuating the atmosphere of said chamber to a predetermined pressure below atmospheric pressure by pulling a first vacuum, stopping said first vacuum, introducing a first flush of one or more gases within said chamber at a pressure above atmospheric pressure and continuing the introduction of said first flush until the chamber pressure reaches a predetermined pressure, stopping the first flush of one or more gases, maintaining the meat within the environment of the first flush of gas or gases at this predetermined chamber pressure for

a predetermined period of time so as to allow at least some of the gas or gases from said first flush to at least partially penetrate the meat structure, releasing the first flush of gas or gases from the chamber, and thereafter sealing the meat within said container.

- [c36] The method according to claim 35 wherein said first flush of one or more gases includes an anti-microbial gas.
- [c37] The method according to claim 35 wherein said first flush or one or more gases includes the modified atmosphere for sealing the meat within the container.
- [c38] The method according to claim 35 including evacuating the atmosphere of said chamber to a predetermined pressure below atmospheric pressure by pulling a second vacuum after the first flush of gas or gases are released from said chamber, and thereafter vacuum sealing the meat within said container.
- [c39] A method for packaging meat comprising placing the meat on a container and introducing said container into a chamber, introducing a flush of one or more gases within said chamber at a pressure above said initial chamber pressure, continuing the introduction of said flush until the chamber pressure reaches a predeter-

mined elevated pressure, stopping the flush of one or more gases, maintaining the meat within the environment of said flush of gas or gases at this predetermined elevated chamber pressure for a predetermined period of time so as to allow at least some of the gas or gases from said flush to at least partially penetrate the meat structure, releasing the flush of gas or gases from the chamber, and thereafter sealing the meat within said container.

[c40] The method according to claim 39 wherein said flush of one or more gases includes an anti-microbial gas.

[c41] The method according to claim 39 wherein said flush of one or more gases includes the modified atmosphere for sealing the meat within the container.

[c42] The method according to claim 39 including evacuating the atmosphere of said chamber to a predetermined pressure below atmospheric pressure by pulling a vacuum after the flush of gas or gases are released from said chamber, and thereafter vacuum sealing the meat within said container.

[c43] A method for packaging a foodstuff comprising placing said foodstuff under a vacuum during its packaging process, providing under pressure at least one flush of one

or more gases to said foodstuff whereby at least some of said gas or gases from said at least one flush at least partially penetrates the structure of the foodstuff within a predetermined time, and thereafter sealing said foodstuff in a container.

[c44] The method according to claims 1 and 43 wherein the foodstuff is meat.

[c45] The method according to claims 1 and 43 wherein the foodstuff is fish.

[c46] The method according to claims 1 and 43 wherein the foodstuff is poultry.

[c47] Packaged meat processed according to the methods of claims 31, 32, 33, 34, 35, 39 and 43.